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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,906	08/21/2003	Yungtaek Jang	36977-190011	6439

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EXAMINER

RILEY, SHAWN

ART UNIT PAPER NUMBER

2838

DATE MAILED: 04/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/644,906		JANG ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Shawn Riley		2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-16, 24 and 25 is/are rejected.
- 7) ☒ Claim(s) 4 and 17-23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____.  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>jan05</u> .   | 6) <input type="checkbox"/> Other: ____.                                    |

**DETAILED ACTION**

Response to amendment and remarks of 15 Feb 2005.

Applicants' remarks and amendments have been carefully considered but not deemed persuasive vis a vis claim one rejection. Applicants point to paragraph 35 as stating that the alternating energy source isolates the primary transformer from the switches which Kammiller fails to disclose. First of all, applicants paragraph 35 states:

Figure 4 shows an exemplary embodiment for a converter in accordance with the present invention. The converter in Fig. 4 is a 111 bridge converter having an input port for receiving input power source  $V_m$  and an output port for supplying output power to load  $R_s$ . The converter employs power transformer  $TR$ , auxiliary transformer  $TRA$ , and a bridge comprising leading-leg primary switches  $Q1$  and  $Q2$  and lagging-leg primary switches  $Q3$  and  $Q4$ , which are controllable switching devices. A controller regulates the load current by periodically switching controllable switching devices  $Q1$ ,  $Q2$ ,  $Q3$  and  $Q4$  into on and off states. Also included in the exemplary converter of the present invention is primary inductance  $L_p$ , capacitor  $Ca2$ , primary diodes  $D1$  and  $D2$ , and blocking capacitor  $Csl$ . On the secondary side, the converter in Figure 4 includes rectifiers  $DRI$  and  $Dr$  and a low pass filter comprising  $Q$  and  $Ct$ . As described further in detail below, the present invention provides **an isolated phase shift controlled full bridge converter** that creates conditions for achieving ZVS, particularly for the leading-leg primary switches  $Q1$  and  $Q2$  under a wide range of load currents and with high power intensity. [emphasis added]

Nowhere is what applicants state repeated in paragraph 35, i.e., an isolated transformer  $TR$ . At best, the full bridge converter is operated as a ZVS device and is 'isolated' in the same manner as Kimmiller—by supplying a substantially constant power to the switches to allow for ZVS switching. If the applicants want to define this as isolation, then Kimmiller also isolates. For at least the above reasons, this action is made final.

**Specification**

The abstract should not refer to **purported merits** (optimizes the conversion efficiency) or speculative applications of the invention and should not compare the invention with the prior art.

Correction is required.

***Claim Rejections - 35 U.S.C. § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5-16 and 24-25 are rejected under 35 U.S.C. §102(b) as being fully anticipated by Kammiller (U.S. Patent 5,563,775). Kammiller shows,<sup>1</sup> (in, e.g., the(ir) figure(s) and corresponding disclosure)

As to claim 1;

A Power Converter, comprising: an input port (Vin) for receiving an input power source; an output port (L) for supplying current to a load; at least one power transformer (10) having a primary side (12, see, e.g., column 4 lines 48-66) coupled to said input port and a secondary side (where R1 & R2 are connected) coupled to the output port; a controller (connection to Q1-4) for regulating load current; one or more controllable switching devices (Q1-4) on the primary side of the power transformer operating under the control of the controller; and at least one alternating energy source (from 14 through 16 connected to Q1-4) that isolates the at least one power transformer from said one or more controllable switching devices.

As to claim 2;

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<sup>1</sup> Note claims will be addressed individually and the material in parentheses are the examiner's annotated comments. Further unless needed for clarity reasons, recited limitation(s), will be annotated only upon their first occurrence. Annotated claims begin with the phrase "As to claim". Claims that are not annotated are seen as having already had the invention(s) addressed previously in an annotated claim. Bolded words/phrases indicate rejected material based 112 paragraph rejections. Underlined words/phrases indicate objected to material

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The power converter of claim 1, wherein the energy supplied by said alternating energy source creates a condition to turn on the one or more controllable switching devices at a substantially zero voltage (The current in either the resonant inductor 14 or the shunt inductance of the power transformer primary winding 12, which is increasing with respect to its switch and thus storing energy to be used for resonant transition.)

As to claim 3;

The power converter of claim 1, wherein the energy supplied by said alternating energy source is dependent on at least one of load current and input power source changes (since 14/16 is connected to both the input and output (load current and input source) it/ac energy is dependent thereon).

As to claim 5;

The power converter of claim 1 further including at least one primary inductor (the inductor 10 on the primary is divided into two parts by the tap of B') for storing the energy supplied by said alternating energy source.

As to claim 6;

The power converter of claim 5, wherein said at least one primary inductor comprises a single winding (literally the primary is a single inductor/winding).

As to claim 7;

The power converter as in claim 5, wherein said at least one primary inductor comprises a plurality of windings (functionally the tapping of the primary winding is divides it/primary into two separate windings).

As to claim 8;

The power converter of claim 1 further comprising at least one pair of diodes for coupling said alternating energy source to a primary inductor.

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As to claim 9;

The power converter of claim 1, wherein the control circuit periodically switches said one or more controllable switching devices (this is how the conversion takes place).

As to claim 10;

The power converter of claim 1, wherein the control circuit periodically switches said one or more controllable switching devices in response to at least one of load current and input power source changes (switching devices senses, e.g., the output voltage peak ).

As to claim 11;

The power converter of claim 1 further including a full bridge (Q1-4 is a full bridge converter) comprising a first leg that includes a first pair of controllable switching devices and a second leg that includes a second pair of controllable switching devices.

As to claim 12;

The power converter of claim 11, wherein the controller controls the operation of the first pair of controllable switching devices and the second pair of controllable switching devices based on a phase-shift (column 4 lines 49-56) caused by at least one of load current and output power source changes.

As to claim 13;

The power converter of claim 11 further including a first primary inductor for storing energy required to create conditions for switching the first pair of controllable switching devices at substantially reduced voltage, and a second primary inductor for storing energy required to create conditions for turning on the second pair of controllable switching devices at substantially reduced voltage (depending on which leg of the full bridge converter is activated, either the first portion of the tapped primary-comprising functionally two primaries—stores the energy) .

As to claim 14;

The power converter of claim 1 further comprising a full-wave rectifier (R1 and R2) at the secondary side of the power transformer.

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As to claim 15 (see rejection of claim 14);

The power converter of claim 1 further comprising a current doubler rectifier at the secondary side of the power transformer.

As to claim 16;

The power converter of claim 1 further comprising a filter at the secondary side of the power transformer (Cf/Cc).

As to claim 24;

The power converter as in Claim 14, wherein a combination of *said second winding of said auxiliary transformer(14)* and said primary winding of said power transformer and said external inductor (is coupled between said first and second bridge legs.

As to claim 25;

The power converter of claim 1, wherein a plurality of power transformer are used for power transformation (primary effectively split in two parts and the secondary split into two parts) said input port to said output port, each said power transformer comprising a primary winding and a secondary winding, wherein said primary windings of said power transformers connection in series (the connection between the two effective parts of primary are connected in series).

***Allowable Subject Matter***

3. Claims 4 and 17-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. As allowable subject matter has been indicated, applicant's response must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 C.F.R. § 1.111(b) and section 707.07(a) of the M.P.E.P.

5. The following is an examiner's statement of reasons for allowance: No prior art uncovered anticipates or renders obvious applicant(s) claimed circuitry including ac energy source having an auxiliary transformer having a first winding and a second winding. Further, no prior art uncovered

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anticipates or renders obvious applicant(s) claimed circuitry including wherein the energy supplied by said alternating energy source is independent of current changes within the converter.

**Conclusion**

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry from other than the applicant/attorney of record concerning this communication or earlier communications from the Examiner should be directed to the Patent Electronic Business Center (EBC) at 1.866.217.9197. Any inquiry from a member of the press concerning this communication or earlier communications from the Examiner or the application should be directed to the Office of Public Affairs at 703.305.8341. Any inquiry from the applicant or an attorney of record concerning this communication or earlier communications from the Examiner should be directed to Examiner Riley whose telephone number is 571.272.2083. The Examiner can normally be reached Monday through Thursday from 7:30-6:00 p.m. Eastern Standard Time. The Examiner's Supervisor is Mike Sherry who can be reached at 571.272.2084. Any inquiry about a case's location, retrieval of a case, or receipt of an amendment into a case or information regarding sent correspondence to a case should be directed to 2800's Customer Service Center at 571.272.2815. Any papers to be sent by fax MUST BE sent to fax number 703.872.9306. Any inquiry of a general nature of this application should be directed to the Group receptionist whose telephone number is 571.272.2800. Status information of cases may be found at <http://pair-direct.uspto.gov> wherein unpublished application information is found through private PAIR and published application information is found through public PAIR. Further help on using the PAIR system is available at 1.866.217.9197 (Electronic Business Center).

April 05

  
**Shawn Riley**  
Primary Examiner